READINESS ASSESSMENT FOR COUNTY ACCOUNTING AND PERSONNEL SYSTEM (CAPS) UPGRADE

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INTERNAL AUDIT DEPARTMENT

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COUNTY ACCOUNTING AND PERSONNEL SYSTEM
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Executive Summary

Introduction

In July 2002, the County of Orange Internal Audit Department contracted with iSecurePrivacy, a professional consulting firm, to assist them in assessing the Auditor Controller's readiness to undertake an upgrade of the County's County Accounting and Personnel System (CAPS). CAPS is an application in widespread use particularly among governmental entities and is marketed as Advantage by American Management Systems (AMS). It was upgraded to Advantage 2.2 in 2001, and that is the currently installed version.

The anticipated Advantage Upgrade will provide similar functionality as the current application on a re-architected platform deploying a relational database (IBM DB2), Java coded scripting, and Intranet access using a Graphical User Interface to improve usability.

The County knows that it will need to upgrade CAPS in the next five years as AMS ceases to support the current version. Internal estimates put together by the Auditor-Controller show the cost of upgrading CAPS is lower than installing a totally new financial software application such as PeopleSoft or JD Edwards.

The County has adopted a system development life cycle model called Software Engineering Excellence (SEE). SEE is an Affiliated Computer Services (ACS) and Application Systems and Programming (AS&P) methodology based on Capabilities Maturity Model (CMM) criteria. ACS is the company that provides third party information technology services to the County. The Auditor-Controller's business plan discusses the use of the CMM to evaluate its implementation of SEE. The Carnegie Mellon Software Engineering Institute, under a grant from the Department of Defense, developed CMM, and it can be used to measure an organization's overall adherence to a development methodology such as SEE.

There are five levels of maturity defined in the CMM. The Auditor-Controller's Office believes it is 60% complete in realizing Level Two maturity.

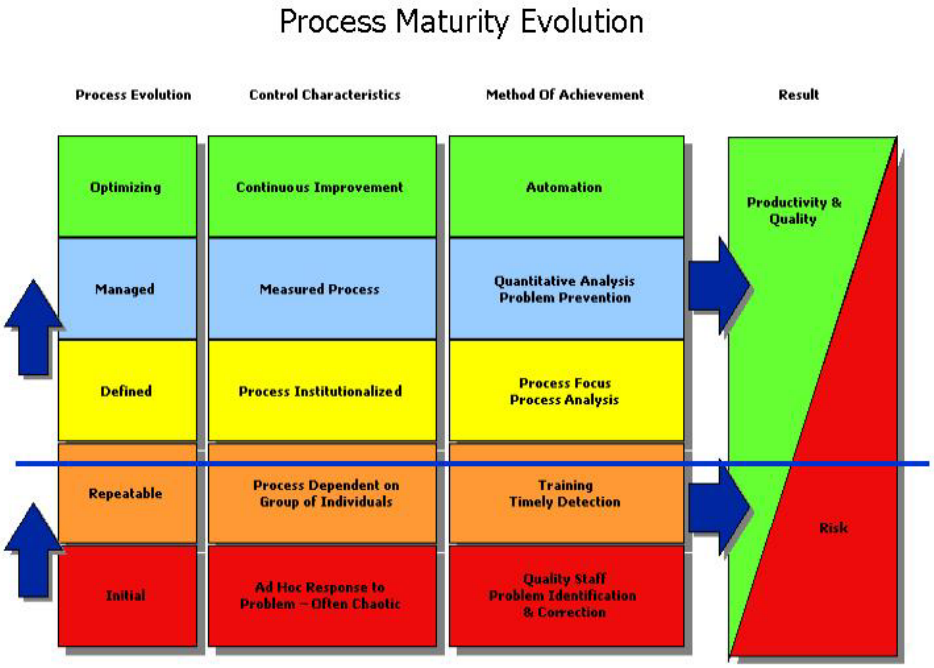
Risk Management Conclusion

Given the required involvement of third party providers, i.e., American Management Systems, Affiliated Computer Solutions, and the impact of CAPS on all County functions (not just Auditor-Controller), we believe there is **MODERATE RISK** in pursuing the CAPS Upgrade.

The County is on the right path to manage and control a project with the significance of the CAPS Upgrade. The technology infrastructure, however, is still defining processes in the decentralized environment. Using the Capabilities Maturity Model, we believe the County remains in **LEVEL TWO** (Repeatable) stage. Its control over system change has a process focus, but is still largely dependent on individuals to ensure the methodology is followed.

In our opinion, the County needs to increase its maturity level at least one level higher to balance risk and quality during the CAPS Upgrade project. We believe the minimum acceptable level for a CAPS Upgrade is **LEVEL THREE** (Defined). At this level of maturity, the process for both project management and software engineering activities are documented, standardized, and integrated into every day activities.

The graphic below shows the maturity model (CMM) from a process perspective and the risk/reward profile.



The CAPS Steering Committee projected attaining Level Two (Repeatable) in June 2002, and it is still working to complete that goal. In our opinion, the main delay is a software configuration management tool, but we also saw evidence that the documentation standards do not appear institutionalized. The target for reaching Level Three (Defined) is June 2003. In terms of this review and our observations, we believe that addressing the vulnerabilities noted below can ensure and expedite reaching Level Three maturity.

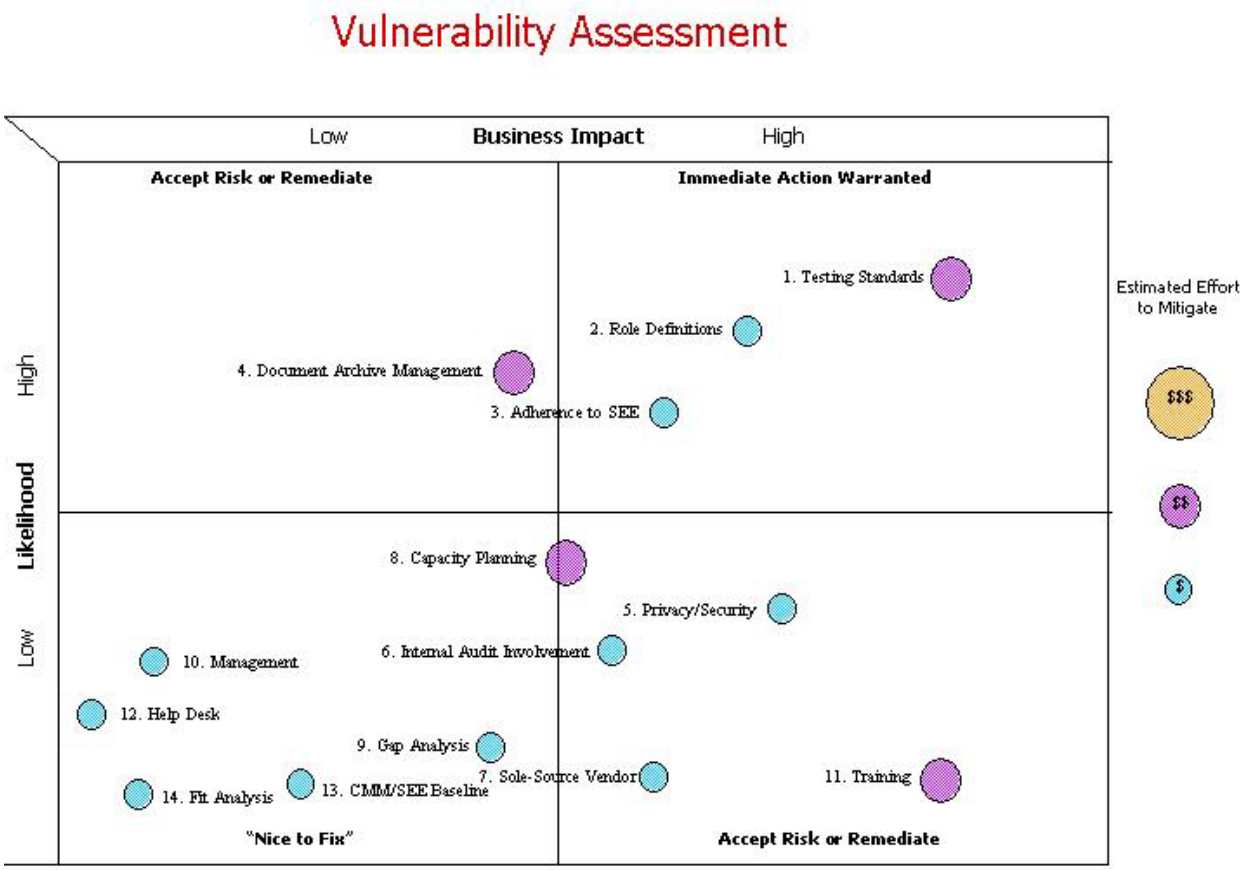
What is needed to achieve Level Three (Defined) among other factors is the ability to manage the CAPS software configuration and to install processes to ensure adherence to SEE. The Auditor-Controller has completed a number of steps to achieve Level Three maturity (Defined) and targets completion in June 2003.

In our opinion, Level Three (Defined) is a minimum level to manage and complete a project such as the CAPS Upgrade. It is only upon attaining Level Three that a defined process is in place to guide all organizational processes toward a controlled technology infrastructure.

Vulnerability Assessment

Below is a pictorial summary of our engagement observations.

We recommend corrective actions be taken related to assessments of the perceived risk. If an issue is in the upper right quadrant of the graphic, we believe the vulnerability is significant and the County needs to take immediate action to mitigate the risk. For observations whose risk places them in the upper left or lower right quadrants, we suggest the County formally evaluate the risk and make a decision to accept or to reduce the vulnerability. We suggest this evaluation be documented. For observations in the lower left quadrant, we classify these as "nice to fix" issues, but they should not require the immediate action or the formal evaluation of the other three quadrants. Items in the lower left quadrant also show areas where management has in place significant control processes that reduce the likelihood of risk.



Summary of Observations

Vulnerability Assessment	*Vulnerability Description*
1. Testing Standards	The County cannot prove that it conducts rigorous testing of changes to production systems. Level Three requires that testing processes be better defined and implemented. We would also recommend greater end user involvement in testing. This will require training users in developing test cases and creating a database of baseline testing.
2. Role Definitions	Our interviews disclosed that there is uncertainty over the role of business users, functional analysts, applications systems and programming, and other outside providers. Level Three requires a high degree of inter-group coordination. That process begins with defining the roles of all parties involved in the Upgrade project. We believe role clarification should also include American Management Systems' consulting role in the Upgrade.
3. Adherence to SEE	The County's use of the SEE methodology mandates process documentation for system changes. We found the documentation was not consistently available. One of the characteristics of Level Three is that project activities are documented, standardized, and integrated into a defined process. We found that the discipline of adhering to the standard was not present and that verification tasks were not evidenced.
4. Document Archive Management	Many requested documents could not be produced – either they were not completed or the County has a flawed retention process. Even if the SEE methodology were fully deployed and followed, Level Three is not attained without being able to retrieve key documents supporting the Upgrade effort. This is not merely an exercise in document storage. As the Upgrade project begins in earnest, the discipline of maintaining a project archive will be in the best interest of the County.
5. Privacy/Security	Project requirements for information security impacts are not well documented. Coordination among the project team, data security administration, and local security administrators must be an ongoing process to design a security model for the new environment. There will no doubt be changes to the security scheme as the Advantage Upgrade, with its more open architecture, is deployed into production. While it is still very early in the project, we did not see evidence of security involvement.

Vulnerability Assessment	*Vulnerability Description*
6. Internal Audit Involvement	The Internal Audit Department has only limited involvement and visibility in system changes. Internal Audit is a user of CAPS, in addition to having a mission of helping to safeguard County assets. The upgrade will result in significant modifications to information available for audit trails. This is another area of inter-group coordination that is a prerequisite for achieving Level Three.
7. Sole-Sourced Vendor	The County is sole-sourcing the CAPS Upgrade to AMS. We understand the rationale and were informed the legal department had concurred this was consistent with County procurement practices. There is some risk in sole sourcing a project of this magnitude. This is not a Capability Maturity Model issue per se, and we understand and concur with the County's rationale for upgrading, rather than replacing its existing CAPS system.
8. Capacity Planning	There is no formal capacity planning unit at the County. This creates risk given the budget realities and the need to anticipate infrastructure changes. This is an area in which the County remains at Level Two and will remain so without a group to manage capacity. Capacity planning is either reactive (Level One or Two) or the function exists and the County moves to Level Four or Five in short order. From the perspective of the CAPS Upgrade, having AMS provide information or even conduct some of its own development testing at the County might suffice as a reasonable solution to this need.
9. Gap Analysis	Vendor supplied documentation may not achieve the level required by the SEE methodology. While this is related to the development of internal documentation, it is a separate issue. We recommend an assessment of AMS's software engineering standards and application documentation to plan for project resources in satisfying the County's standards. Java and Versata are new technologies for AMS and the County.
10. Management	We found County and third party management to be professional and knowledgeable of issues likely to be encountered in the CAPS Upgrade. We found general agreement and appreciation of the need to move to Level Three. We do not believe management will have any negative impact on its attainment. We do believe that succession planning and training in the new technology being deployed are County needs.

Vulnerability Assessment	*Vulnerability Description*
11. Training	The County employs a professional firm to provide training in CAPS and other business processes. We reviewed the overall curriculum and summaries of class evaluations and determined the training is adding value to County staff. The need for training will become even more important as the CAPS Upgrade approaches production.
12. Help Desk	The Help Desk appears to document all calls and is vigilant in following up on issues. This is an important aspect of inter-group communication required in Level Three. We believe there is no significant issue here, and suggested to CAPS team members that the Remedy tool would be beneficial throughout the Upgrade project.
13. CMM/SEE Baseline	The County's acceptance of the SEE development methodology and its desire to improve its maturity as defined in the Capabilities Maturity Model is commendable. The deployment of a software configuration management tool would greatly increase the County's ability to manage the software environment. As the Upgrade project moves from requirements into design, development, and testing, this tool would be vitally important. In addition to this, the SEE methodology needs to address conversion and back out planning.
14. Fit Analysis	The County has contracted with AMS to jointly develop a comprehensive requirements document and analyze the evolving business environment. Based on the documents that AMS is providing and the County users are completing, this is an excellent basis on which to define the new process environment and coordinate the activities of users, developers, and project management.

Audit Scope and Approach

Scope

The County is just beginning its next major CAPS upgrade to Advantage 3.0. However, we found little upgrade project documentation to be currently available. We determined the best way to assess readiness to undertake an upgrade project of the Advantage 3.0 size and impact was to review past methodology and recent past implementations. We reviewed the Software Engineering Excellence (SEE) requirements to assess robustness in controlling a significant development effort.

We initially intended to evaluate documentation from three recent projects: BRASS, Financial Tables Archive, and the older Advantage 2.1 project documentation. This proved impossible, as documentation was not readily available for the Financial Tables Archive or the Advantage 2.1 project. The BRASS implementation was largely managed by American Management Systems consultants and did not follow the SEE methodology.

Therefore, we instead obtained information on the block point releases 2002.07 and 2002.09 from ACS Applications Systems & Programming. The County organizes multiple application changes into block releases to increase the stability of the environment. The majority of the application changes reviewed (25 out of 26) would be considered non-major projects under the County's sizing standard.

Approach

This review was based on interviews and assessments of documentation provided by various Auditor-Controller staff, County Executive Office - Office of Information and Technology's (CEO/IT) staff, and ACS contractor staff. We used the SEE Major Project documentation requirement as a baseline and evaluated its comprehensiveness in terms of this Upgrade project. We also reviewed the SEE documentation requirements for a Non-Major Project. We then compared existing documentation to determine how well it complied with the established SEE requirements.

By using this indirect approach we facilitated the assessment of the County's readiness for a major upgrade.

Development Risk Areas

The CEO/IT maintains a centralized technology infrastructure designed to manage the mainframe computing resources and wide area network. The CEO/IT also oversees mainframe security (using IBM's RACF product) and network deployment of the LAN/WAN. Much of the remaining operations of the central environment are outsourced to ACS, a service-provider that conducts daily operations including backup and recovery. ACS does use the Software Engineering Excellence (SEE) methodology within its Applications Systems & Programming group.

Most County agencies and departments employ functional analysts with technical backgrounds. They work closely with ACS to ensure orderly change migration and development consistent with County priorities. The Auditor-Controller is the data owner responsible for overseeing the CAPS system including application and integrity maintenance and user security. The Auditor-Controller has a dedicated staff of functional analysts that appear knowledgeable and professional from the context of our involvement with them during our assessment. This major upgrade project will also use resources from American Management Systems, ACS, and other internal organizations.

Implementing an upgrade to a comprehensive processing system is vulnerable to risks. The County is mandated to provide services and it cannot simply avoid the risk by not honoring its commitments to constituents and the public it serves.

Acknowledgement

Throughout our engagement, we informed the County of issues we detected. The business units responded in a positive and timely manner. Throughout the project, County and contractor staff contacted was extremely helpful and forthcoming with available information. We would like to thank the Auditor-Controller staff, CEO/IT staff, and ACS staff for their support and cooperation during the audit including: David Sundstrom, Auditor-Controller/CAPS Executive Sponsor, Larry Chanda, A-C/CAPS Project Manager, Mahesh Patel, A-C/Systems Division Manager, and Phil Paker, ACS CAPS Manager.

Observations

Detail Observations

The following section contains the details of the vulnerabilities identified in the matrix above on page 5.

1. *Testing Standards*

Testing Is Not Well Documented – Base Test Cases Are Under Development

Projects of all sizes can fail or result in production defects when system processes are not rigorously tested. Such testing typically requires the participation of business users because they are ultimately responsible for business processes, and they often devise testing that developers do not consider.

Observation: Our review of block releases 2002.07 and 2002.09 showed that testing is not well documented. Out of 24 tasks released into production, only 6 had documentation pertaining to the unit testing that was performed (all but one of these tasks would be considered a non-major project under the County's definition). We were informed that user acceptance testing is typically discarded soon after the change is introduced into production.

For those projects in which there is evidence of unit testing, the tests performed appeared to be rudimentary and not designed with the perspective of "breaking the application." The following are excerpts from documentation ACS supplied.

Task	Test Scenario	Expected Results	Actual Results/Comments
T0846 – Test Plan	On the SUSE screen in character base, the LAST USER field must show the full User-ID.	On the SUSE screen in character base, the LAST USER field will show the full User-ID.	No results noted.
T0846 – Test Plan	On the SUSE screen in Advantage Desktop (HR) the LAST USER field must show the full User-ID.	On the SUSE screen in Advantage Desktop (HR) the LAST USER field will show the full User-ID.	No results noted.
T0857 – Test Case	The report will contain the Agency #, Agency Name, Balance and Message fields.	The report contains the Agency the Agency #, Agency Name, Balance and Message fields.	"Looks Good"
T0857 – Test Case	If the YTD balance is a debit amount, the message "overdrawn" will be indicated in the Message field.	If the YTD balance is a debit amount, the message "overdrawn" will be indicated in the Message field.	"Looks Good"

Task	Test Scenario	Expected Results	Actual Results/Comments
T0870 – Test Case	Take out W-21 from Pay Rate Schematic.	Take out W-21 from Pay Rate Schematic.	"Looks Good"
T0870 – Test Case	Take out column for step 1 – step 11 from Salary Schematic in CP schedule.	Take out column for step 1 – step 11 from Salary Schematic in CP schedule.	"Looks Good"

We also noted that testing control documents are not consistently completed. Task 0846 test checklist has no indication that a second individual verified it. Task 0847 has a completed test case checklist, but there was no test plan or test results. Task 0881 has a test plan document, but it is incomplete and has no expected or actual results. We noted that Tasks 0857 and 0870 had test checklists that were completed and verified; however, the test cases appear to be very high-level and do not evidence rigorous testing.

We reviewed one project that would be classified as a "major project" (more than 500 hours effort or $50,000 in cost). Task T0849 in the 2002.07 block release had a very detailed requirements document and its communication log was extensive. However, there was no documented unit testing, and the migration documentation was not in evidence.

We reviewed Help Desk tickets in the REMEDY tracking system. Out of 25 sampled tickets, 3 indicated there was a defect with a production program. The scope of our project did not include a detail review of REMEDY tickets or an assessment of whether these production abnormal terminations were the result of poor testing. We are comfortable that production problems have high visibility and the County is striving for "zero software defects."

ACS has testing support products installed in the mainframe environment, e.g., Compuware's QAHiperstation and Princeton Softech's Hour Glass. Hour Glass was purchased in support of the Year 2000 project. QAHiperstation is useful in recording scripts used for testing online systems. We were provided with information discussing the use of these tools to develop baseline testing. The ACS goal is that eventually all unit testing will be performed in a consistent manner based on established test scripts. This effort is not as far along as systems and programmer managers would like.

There is a quality assurance function staffed within ACS. In our discussions with the manager of quality assurance, we were told that Software Quality Assurance (SQA) does not review project documentation or testing, just the authorizations for migrating the change into production.

Discussions with various functional analysts indicated user acceptance testing is performed, but results are not retained. There are different practices depending on the functional analyst conducting the test or requesting the change. We noted there was documented communication between the functional analyst and ACS for Task 0852. This communication indicated the functional analyst detected issues and additional changes were warranted.

We also noted that the functional analysts appear to perform the majority of the user acceptance testing. Best practice would involve the business user in system testing as well. The functional analysts understand CAPS very well, but it is ultimately the end user who has to deploy changes into a business environment.

Recommendation:
We recommend implementing a strong testing procedure involving business users. In addition to testing the actual change being moved to production, testing helps the organization to compile a library of test cases that can be used for major implementations such as the CAPS Upgrade. This is a significant effort and we suggest that it begin in earnest as soon as possible.

Based on our observations, we believe the County is increasing risk to the Upgrade project effort by not developing baseline test cases as changes are moved into today's production environment.

Response:

Concur – QAHiperstation was purchased by the County to aid in the standardization of testing and is currently in the process of being deployed. Estimated completion for CAPS is 4th quarter 2004.

2. *Role Definitions*

Role Conflicts Were Disclosed During Interviews

The County maintains a centralized information services organization (outsourced to ACS), but augments control of projects and system processing through functional analysts attached to County agencies and departments. CAPS has an active and professional information systems group. These individuals specialize in system processes involving financial accounting, human resources, and payroll.

Observation: During interviews, we detected uncertainty over the roles that functional analysts, ACS systems and programming staff, and AMS would fulfill for the CAPS Upgrade project. While the impact of this uncertainty could be months in the future, it is a current issue for the County to resolve. The combination of decentralized control, centralized technology services (especially in an outsourced environment), and vendor software packages requires a delicate balancing act to achieve the County's objectives.

Our sense is that the County will reduce its ability to manage CAPS if AMS is the leader in the development effort. This could also be a resource issue for AMS and the County as other governmental customers begin moving into the Advantage 3.x release. AMS itself is encouraging this possibility through its public statements that it will cease support of Advantage 2.x in three years. One possible solution is for ACS to partner with AMS in the County's upgrade

Role decisions need to be made early in the Upgrade project to ensure that training is focused on the appropriate roles and responsibilities. We also detected uncertainty regarding future accountability between the information services organization and the information systems groups. In a modern technology environment, the business user often maintains control over system parameters and performs basic data extracts, but has an approval role in application changes and programming. As CAPS is upgraded to its new version, this distinction will be blurred. The expected AMS architecture will enable users to define and implement changes to the user interface.

Additionally, we noted that four individuals are authorized to approve changes to the CAPS production environment (reference Mainframe Migration document version 3.0). Two of these individuals are ACS Applications Systems and Programming personnel. This is inconsistent with the concept of data ownership as defined in the information security policy 03.03.02.00.00 – IBM Data Security. ACS staff indicated this is necessary because of emergency change procedures and production changes that do not affect customer processing, e.g., job control language and system parameters. We discussed this with Software Quality Assurance and were informed that CAPS processing occurs from production libraries only so "emergency changes" are not temporarily compiled into emergency libraries. This is not the practice in the industry. We noted there is a daily production meeting in which production issues are discussed and this might be a mitigating control for emergency changes.

Recommendation:
We have no best practices model to guide the County in its evolving CAPS environment. However, we believe that roles need to be defined early in this Upgrade project to ensure that they are understood and that training is provided to those individuals responsible for application functions.

We also suggest that a partnership between AMS and ACS could be a win-win for both of those organizations and the County as well.

Response:
Concur – The CAPS upgrade project will require re-assessment of the role of business users, functional analysts, developers and vendors. The implementation strategy from the CAPS Upgrade Fit Analysis will address the roles of each as well as the training requirements. Expected completion is 2nd quarter 2003.

3. *Adherence to Software Engineering Excellence (SEE)*

There is inconsistent adherence to SEE
By necessity, there is a significant amount of documentation required to support a development project. This documentation is designed to ensure an orderly process and an adequate review by internal systems and user personnel.

Observation: We reviewed documentation from Block Point Releases 2002.07 and 2002.09. The 2002.07 documentation is incomplete and is also criticized in the ACS internal review. While we noted improvement in 2002.09, it lacks the detail to adequately document the system change process.

The majority of tasks reviewed would be considered Non-Major under the County's sizing guidelines. We noted that the abbreviated requirements document for non-major projects was not used for any of these CAPS tasks. This is not necessarily a deficiency, but it might indicate a need for more training in the use of SEE methodology. After discussing this with ACS managers, we were told that the abbreviated document is used in many non-CAPS groups, but the CAPS analysts normally use the same document for all requirements definitions. As long as this does not pose substantial resource issues, the non-abbreviated document clearly addresses all the issues for a production change.

ACS's internal review of required SEE documentation is not verified consistently.

User involvement is evident in 2002.09 – especially by the functional analysts – but the evidence of user involvement is not well documented. There were several instances in 2002.07 where functional analyst or business user approval could not be located. Production migration requires business user authorization, by policy, but their involvement throughout the development project is difficult to observe.

There appears to be uncertainty about testing responsibility. The CAPS Block Point Task Folder Checklist indicates test cases, test planning, test checklists, and test summaries will be provided as ACS "takes over testing." User involvement in testing is a critical success factor and it is unclear how much testing ACS will take over. The business users' participation in testing in the current environment is not well documented.

Migration documentation is not archived consistently in the Block Point Release folder. Out of 24 production migrations, ACS could provide migration documents for 11 changes. We were informed that a separate authorization is sent via email to MOVES, which is under the control of Software Quality Assurance. This email is the system owner's approval to initiate the production move. We are comfortable that no changes are moved into production without a migration request (based on our interview with SQA), and believe this is a matter of managing the task documentation.

According to policy, all major projects and block point releases require a post deployment review. These reviews are currently documented in the daily production status meeting, but are described as "high level."

Recommendation:
We believe that there is sufficient time to address these issues prior to the start of the CAPS Upgrade project. In our opinion, they must be addressed in order to ensure the upgrade is controlled.

We suggest that ACS be copied on the MOVES authorization to retain the migration approval in the task documentation folder.

Response:
Concur – Software migration documentation will be stored in the Block Point Release (BPR) documentation folder until the planned Configuration Management (CM) system is deployed for CAPS. At that time all change management documentation will stored in the CM system indexed to the related task. Storage of move documentation began with BPR 2003.01 in January, 2003. Conversion to CM storage is dependent on the CM acquisition and deployment, estimated 3rd quarter 2003.

4. *Document Archive Management*

County Requires Better Management of Project Documentation

The SEE methodology mandates that a significant amount of documentation will be generated for development projects. The documentation has reduced value if it cannot be located for reference or made available for review after the project is complete.

Observation: Many requested documents could not be produced. It appears that decentralization has hampered the ability to retain a complete history of development efforts.

Recommendation:
We believe that a single repository of project documentation needs to be created. This could be housed with the functional analysts, with ACS Applications Systems and Programming, or with another organizational unit. Without this single location, relevant and/or required documentation may be lost or never created. We are not suggesting a file retrieval application be purchased. We found the method currently deployed would be sufficient providing all project documents are collected.

Response:
Concur – A centralized library of project documentation is being developed and will be established by the end of the 2nd quarter, 2003.

5. *Privacy/Security*

Information Security and Auditability Are Often Omitted From Project Scope

The County has information that is not intended for public access. This is similarly true for internal staff in that not everyone is entitled to change or view information without a defined business need. The CMM/SEE methodology has a decision-step to involve information security or internal audit in a project. The decision is made in the Requirements Definition phase and there are several criteria to consider, e.g., restrictions on communications between systems and applications, replication requirements and restrictions on data, processes requiring audit trails, and retrieval of historical audit data.

Observation: Our review of block point releases 2002.07 and 2002.09 showed that information security and audit are often marked "not applicable" (N/A) during the requirements definition. Some N/As appear to warrant consideration of security and audit requirements such as:

- Perfect Presentment Positive Pay (T0850) changes the check reconciliation process and creates a new file for Wells Fargo. The Requirements Document indicates that audit and security will be unchanged from earlier tasks, but this appears inconsistent with the project description. The file transfer procedure with Wells Fargo is changing and there will be two bank reconciliations to perform after data is separated into two files.

- Add Fields To Simple Extract For UNIFI (T0852) creates a new biweekly process that is based on a daily job. It would appear this has security implications.

- Trust Fund Balance Report (T0857) creates a new program and report for the Auditor-Controller. It would appear that this report might be restricted to certain users and yet there are no security requirements noted.

- Automated Approval Log (T0863) creates an approval log that would appear to be subject to audit trails and historical information. Audit requirements are marked as N/A. The project also identifies compliance with County ordinance as a justification for the change, yet regulatory requirements are also N/A.

These are several examples. Admittedly, we do not have the in depth knowledge to assert unequivocally that these changes warrant audit and security action. We offer these as possible examples of a breakdown in the Requirements Definition.

We noticed that the non-major project abbreviated Requirements Document does not mention the need to evaluate security and auditability impacts (reference Non-Major Project Summary Template).

It seems likely that all non-major projects could also have security and audit requirements.

Recommendation:
We suggest that guidelines be improved for defining the decision criteria used to include or exclude information security and audit from application developments and enhancements. Many organizations require a positive statement concerning why a potential impacted area is not applicable.

Response:

Concur – A positive statement relating to security will be made mandatory on all Requirements Definition Documents (RDD) starting with BPR 2003.05, planned for the months of April/May 2003.

6. Internal Audit Involvement

Audit Involvement in CAPS Upgrade Is Warranted

The Internal Audit Department is not fully participating in the CAPS Upgrade project.

Observation: The Internal Audit Department has significant skills and many of the staff are certified in systems audit and control disciplines, its ability to add value to the project is limited by its exclusion from the SEE implementation methodology.

Recommendation:
We suggest the Internal Audit Department has important roles in system development projects even though their role in systems developments is not included in the SEE implementation methodology. Internal Audit should be involved to ensure management implements adequate audit trails, to ensure management maintains open auditability of the system, and to ensure the SEE implementation methodology is used to the project's benefit.

Furthermore, in accordance with the COSO model adopted by the Auditor-Controller's Office, we recommend that the Internal Audit Department clarify its role in assessing whether management is adequately addressing its responsibilities for establishing proper and adequate internal controls during system implementations.

Moreover, we understand that County Accounting Policy (CAP) No. 34 is currently under revision and will provide the needed clarification regarding both the Internal Audit Department's and County management's respective roles for the development of internal controls during system implementation. Our review of a draft of CAP 34 reassured us that the revised CAP will preserve the independence of the Internal Audit Department by limiting their involvement in system development and implementation to an oversight role, and it specifically precludes them from designing, installing, or operating any aspect of the system. The current revisions properly clarify that County management is primarily responsible for both the establishment and maintenance of internal controls, and that the Internal Audit Department is solely responsible for assessing management's fulfillment of their fiscal responsibility.

Response:
Concur – The Auditor-Controller's Office, County Executive Office and the Internal Audit Department (IAD) will jointly define a mutually agreeable IAD role on the CAPS upgrade. Estimated completion 2nd Quarter 2003.

7. Sole Source Issues

CAPS Upgrade Is Sole-Sourced To American Management Systems

The County has a structured procurement process. Initially, we were uncertain if the CAPS project was following County procurement policy. In discussions with procurement, legal counsel, and the Auditor-Controller, we were satisfied that an "upgrade" did not require formal competitive bids.

Observation: We noted conflicting language describing the CAPS upgrade. We saw documentation and were told in interviews that it was an implementation of a completely new system. For example, the County's FY 2002-2003 Budget Workbook indicates planning for the ***replacement*** of the CAPS system was begun. We did note the descriptor "upgrade" is used predominately.

Recommendation:
We recommend that all references to this project be termed the CAPS Upgrade Project.

Response:
Concur.

8. Capacity Planning

Capacity Planning and Management May Not Be Adequate For The Upgrade Project

Capacity planning is a critical function at large data centers because it analyzes central processor usage, storage needs, and network performance. It then projects future needs based on the strategic plan.

Observation: Both CEO/IT and ACS staff indicated that there is no formal planning process for infrastructure needs. Formal planning is a prudent practice, especially in advance of a major upgrade. During a major development effort there will be significant use of central processing unit (CPU) and direct access storage device (DASD) in order to support development and testing.

We noted that the CAPS project manager maintains documentation pertaining to capacity needs, but this information is not consolidated into an overall plan for data center capacity.

We were informed about the possibility of AMS using the County of Orange to benchmark its new Advantage release. Should this occur, the County would obviously have the benefit of understanding first-hand the capacity implications of the new architecture.

Recommendation:
We recommend the County project and analyze its needs for CPU and DASD over the next 3-5 years in order to properly price the upgrade project and ensure that sufficient budget allocations are requested. These related costs need to be included in the total project cost. Additionally, the new CAPS architecture will probably increase demands on network resources because it is a browser-based system.

Response:
Concur – Although there are certain procedures in place for capacity planning there is no formal process. The new CIO intends to implement a formal capacity planning process. Estimated completion is 4th Quarter, 2003.

9. Documentation Standards

Any Gap Between AMS And County Documentation Requirements Must Be Addressed

All vendors create system documentation based on their own internal standards. They provide this documentation to customers basically "as is." Often it contains discrepancies between internal standards and what the vendor provides.

Observation: The functional analysts and ACS indicate the vendor documentation is quite good in meeting the County's needs. We did not review the documentation AMS provides as part of this engagement, but it would be surprising if it met all the County's internal standards.

Recommendation:
We recommend that documentation available for the existing CAPS release be reviewed and mapped into the CMM/SEE methodology. An issue could arise and require an Upgrade task to address gaps in AMS documentation and how the internal requirements will be satisfied.

Response:
Concur – AMS documentation received during the CAPS upgrade project will be included in the project library.

10. Management Resources

Management Resources Are Professional and Technically Competent

An organization must rely on its people to meet organizational objectives. During the course of this engagement, we had the opportunity to interface with a number of County and ACS technology staff.

Observation: We found in the conduct of this review that both County and contracted managers are dedicated to performing their responsibilities with professionalism and competence. We were impressed with the County's management staff throughout the audit. We interviewed individuals and requested many documents. We found managers were responsive and interested in helping this audit. We also did not find the County or ACS management staff defensive or hesitant about their concerns, but were always interested in helping the County perform at a higher level.

Recommendation:
We recommend that succession planning and cross-training be formalized. We were informed during several meetings that technical succession planning is a concern. Given the depth of knowledge evidenced by senior County technology managers, we feel it would be difficult to replace them.

Response:

Concur - Succession Planning entails a broad approach for developing and maintaining an organization's "bench strength". The County of Orange currently has the following in place in relation to overall organizational succession planning which includes Information Technology (IT) Managers:

- Leadership Training such as LEAD and Enlightened Leadership which stress the important role of leadership within the organization and targets development of specific and contemporary leadership competencies (communication, ethics, self-assessment, etc.) and reinforcing the need to think creatively and organizationally
- Recruitment efforts are focused, market and competency based. All management recruitments are under the direction of CEO/Human Resources which provides recruitment guidance in regard to those efforts.
- County performance management systems provide an opportunity for individuals to set developmental goals and stretch goals that open doors for advancement.
- A Tuition Reimbursement Program is available for further professional development.
- Transfer opportunities are available for other professional experiences in various departments.

Specific to IT Management:

- It is important to note that a baseline study of IT competency requirements has been conducted which can serve as a foundation for recruitment and development efforts related to succession planning activities.
- Also key is that the County's Business Planning process includes critical discussion at the Agency/Department level relative to specific workforce planning. Departments thereby have the opportunity to develop specific objectives regarding their succession planning needs.

- There is also a Countywide IT entity potentially available to assist broadly with IT management succession planning which could possibly incorporate a rotational option.
- One thing that would benefit an overall succession strategy would be an inventory of existing KSAs, identification of gaps, and targeted development or recruitment to close those gaps. This would require departments working together to facilitate the inventory as well as realigning existing resources or joining efforts to recruit.

Specific to the CAPS Upgrade Project Team:

- Project Teams have been established for each project that includes cross training opportunities within that context. Also it is anticipated that additional cross training opportunities for staff will be identified within the scope of the CAPS Upgrade Project.

11. Training

Use of Professional Services Firm for Training

The County has commissioned GCAP to provide its CAPS training.

Observation: We reviewed the curriculum for the training program and found it to be comprehensive. We also reviewed summaries of evaluations that County staff complete after attending training staff and found the GCAP training to be well received. Installing a major software upgrade will require extensive and intensive training for all users to reduce risk during conversion to the new system

Recommendation:
We support the County's use professional training in light of Upgrade.

Response:

Concur – The Auditor-Controller and County Executive Office will use the GCAP group for end-user Upgrade training. In addition to classroom training the County is committed to continually keeping in touch with our customer's satisfaction with the system via customer satisfaction surveys, site visits, just in time training, etc. in order to meet those needs.

12. Help Desk

Help Desk Performs Tracking of Production Issues

The County contracts its Help Desk to ACS. The Help Desk uses a software package called Remedy to track and report issues within the production environment.

Observation: The tickets we reviewed were quite detailed and showed significant logging of events and remedial action. We also noted the Help Desk retains its visibility of reported issues and follows up with responsible parties to move toward resolution.

We noted that tickets have had their priority changed during the resolution process. When a matter is reported, it is assigned a priority that outlines response times and action based on the Service Level Agreement (SLA). As the matter is worked, the priority is changed if the original, immediate issue is addressed. We understand this practice in reality, but believe it could distort responsiveness in addressing production failures. This could impact Help Desk and ACS performance vis-à-vis its SLA with the County.

We were also informed that some Remedy tickets are closed once the immediate issue is resolved even though there are follow up tasks that must be completed. These occurrences are managed, but it does not appear there is a standard practice.

Recommendation:
We recommend management assess and approve the process of changing trouble ticket priorities or closing them prematurely. From our experience, the usual practice is: urgent tickets are typically closed once the immediate issue is resolved and a second ticket is opened to control any follow up tasks.

Additionally, we recommend using Remedy as an effective method of tracking issues during the upgrade project. This would probably entail a Remedy Process dedicated to the Upgrade project. Initial discussions with County technology managers indicated their agreement with this recommendation.

Response:

Partially Concur - We concur with the first recommendation. We will review our help desk procedures and implement a policy of closing urgent tickets and opening a new ticket at a lower priority for follow up work. Estimated completion is December 2003.

In regards to the second recommendation, we are developing an issue tracking database that will not only track project issues but will also be a document repository. We believe this is a better solution than using Remedy.

13. SEE/CMM Baseline

Software Engineering Excellence (SEE) Establishes Excellent Baseline

The County is evaluating its technology infrastructure with a model called the Capabilities Maturity Model. This model will help measure the quality and level of risk within the County's technology environment. The County has a defined set of documentation called SEE. This defines the process required to migrate system changes into production.

Observation: To begin, we found the SEE baseline model to be comprehensive and it can establish the necessary framework in which to manage changes within the technology infrastructure.

We noted that SEE does not have detailed information on planning conversion efforts. We draw attention to this limitation because it will definitely be needed for the Upgrade.

The County has a complex technology environment. Maintaining control over a significant number of production, development, and test datasets is a daunting task. We were informed the County is close to purchasing a software configuration management tool to assist in controlling its production systems. We concur that such a system is beneficial in ensuring control over the technology infrastructure. This would also help the County to advance to Level Three maturity.

Recommendation:
We support the County's use of a configuration management tool and urge it to be deployed into the agencies and departments if successful in CAPS and the implementation.

Response:

Concur – The County is currently in the process of acquiring a Configuration Management System (CM) for deployment in CAPS. Estimated deployment 3rd quarter 2003.

14. Fit Analysis

County Contracted AMS to Develop Requirements Document

Establishing requirements for the Upgrade project is a critical task. This process will determine the level of effort and customization that is required to install the new application into the County's technology infrastructure.

Observation: AMS is currently conducting a Fit Analysis to determine how well its new system will meet the County's business objectives. This study is advancing well, and we were impressed with the business process analyses that we obtained. AMS is also prototyping the business processes on its server based system to demonstrate the suggested evolution to the upgraded product.

Recommendation:
We believe there is substantial value in the work already performed and it will greatly facilitate the Upgrade project; continued support from County business users is critical.

Response:

Concur – The fit analysis for the Advantage 3.x Finance/Purchasing System is planned for completion in 2nd quarter, 2003. The fit analysis for Advantage 3.x Human Resources system is planned for completion 4th quarter, 2003.

Management Response

County of Orange

MEMO

March 11, 2003

TO: Peter Hughes, Director
Internal Audit

SUBJECT: Response to Internal Audit's Readiness Assessment for CAPS Upgrade Project

We have reviewed the draft report prepared by the Internal Audit Department covering its assessment of the County's readiness for a major upgrade of the CAPS system. The audit report includes activities performed by Auditor-Controller, CEO-Human Resource and CEO-Information Technology staff. The attachment responds to recommendations made in the assessment.

Please call Larry Chanda at (714) 834-2181 if you have any questions concerning our response.

David E. Sundstrom
Auditor-Controller

Jan Walden
Assistant CEO
Human Resources

Daniel Hatton
Assistant CEO
Information & Technology

Attachment

cc: Eli Littner, Deputy Director, Internal Audit
Gary Burton, Assistant CEO, Finance and Budget
John Nakane, Chief Assistant Auditor-Controller
Jim McConnell, Assistant Auditor-Controller, Central Operations
Shaun Skelly, Assistant Auditor-Controller, Agency Accounting
Larry Chanda, Manager, CAPS Administration
Mahesh Patel, Assistant Auditor-Controller, Information Technology
Jim Berch, Accounting Systems Manager, Auditor-Controller
Ray Stephens, Payroll Systems Lead, Auditor-Controller
John Wheeler, Information Systems Manager, CEO-IT
Susan Paul, Employee Relations, CEO-HR
Marguerite Adams, Corporate HR Services,CEO-HR
Scott Sanders, Sr. Systems Analyst, CEO-HR
Phil Paker, ACS State and Local Solutions

Management Response Continued

1. Testing Standards

Testing Is Not Well Documented – Base Test Cases Are Under Development

Recommendation:

A strong testing procedure, involving business users, is an industry standard for installing change into production. In addition to testing the actual change being moved to production, testing helps the organization to compile a library of test cases that can be used for major implementations such as the CAPS Upgrade. This is a significant effort and we suggest that it begin in earnest as soon as possible.

Based on our observations, we believe the County is increasing risk to the Upgrade project effort by not developing baseline test cases as changes are moved into today's production environment.

Response:

Concur – QAHiperstation was purchased by the County to aid in the standardization of testing and is currently in the process of being deployed. Estimated completion for CAPS is 4th quarter 2004.

2. Role Definitions

Role Conflicts Were Disclosed During Interviews

Recommendation:

We have no pre-conceived model to guide the County in its evolving CAPS environment. However, we believe that roles need to be defined early in the Upgrade project to ensure that they are understood, and that training is provided to those individuals responsible for application functions.

We also suggest that a partnership between AMS and ACS could be a win-win for both of those organizations and the County as well.

Response:

Concur - The CAPS upgrade project will require re-assessment of the role of business users, functional analysts, developers and vendors. The implementation strategy from the CAPS Upgrade Fit Analysis will address the roles of each as well as the training requirements. Expected completion is 2nd Quarter 2003.

3. Adherence to Software Engineering Excellence (SEE)

There is inconsistent adherence to SEE.

Recommendation:

We believe that there is sufficient time to address these issues prior to the start of the CAPS Upgrade project. In our opinion, they must be addressed in order to ensure the upgrade is controlled.

We suggest that ACS be copied on the MOVES authorization to retain the migration approval in the task documentation folder..

Response:

Concur – Software migration documentation will be stored in the Block Point Release (BPR) documentation folder until the planned Configuration Management (CM) system is deployed for CAPS. At that time all change management documentation will stored in the CM system indexed to the related task. Storage of move documentation began with BPR 2003.01 in January, 2003. Conversion to CM storage is dependent on the CM acquisition and deployment, estimated 3rd quarter 2003.

Management Response Continued

4. Document Archive Management

County Requires Better Management Of Project Documentation

Recommendation:

We believe that a single repository of project documentation needs to be created. This could be housed with the functional analysts, with ACS Applications Systems and Programming, or with another organizational unit. Without this single location, relevant and/or required documentation may be lost or never created. We are not suggesting a file retrieval application be purchased. We found the method currently deployed would be sufficient providing all project documents are collected.

Response:

Concur – A centralized library of project documentation is being developed and will be established by the end of the 2nd Quarter, 2003.

5. Privacy/Security

Information Security and Auditability Are Often Omitted From Project Scope

Recommendation:

We suggest that guidelines be improved for defining the decision criteria used to include or exclude information security and audit from application developments and enhancements. Many organizations require a positive statement concerning why a potential impacted area is not applicable.

Response:

Concur – A positive statement relating to security will be made mandatory on all Requirements Definition Documents (RDD) starting with BPR 2003.05, planned for the months of April/May 2003.

6. Internal Audit Involvement

Audit Involvement In CAPS Upgrade Is Warranted

Recommendation:

We suggest the internal audit department has important roles in system development projects even though their role in systems developments is not included in the SEE implementation methodology. Internal audit should be involved to ensure management implements adequate audit trails, ensure management maintains open auditability of the system, and ensure the SEE implementation methodology is used to the project's benefit.

In accordance with the COSO model adopted by the Auditor Controller's Office, we recommend that the Internal Audit Department clarify its role in assessing whether management is adequately addressing its responsibilities for establishing proper and adequate internal controls during system implementations.

We understand that County Accounting Policy (CAP) No. 34 is currently under revision and will provide clarification regarding both the Internal Audit Department's and County management's respective roles for the development of internal controls during system implementation. Our review of a draft of CAP 34 reassured us that the revised CAP will preserve the independence of the Internal Audit Department by limiting their involvement in system development and implementation to an oversight role, and specifically preclude them from designing, installing, or operating any aspect of the system. The current revisions properly clarify that County management is primarily responsible for both the establishment and maintenance of internal controls, and that the Internal

Management Response Continued

Audit Department is solely responsible for assessing management's fulfillment of their fiscal responsibility.

Response:

Concur – The Auditor-Controller's Office, County Executive Office and the Internal Audit Department (IAD) will jointly define a mutually agreeable IAD role on the CAPS upgrade. Estimated completion 2nd Quarter 2003.

7. Sole Source Issues

CAPS Upgrade Is Sole-Sourced To American Management Systems

Recommendation:

We suggest that all references to this project be termed the CAPS Upgrade Project.

Response:

Concur

8. Capacity Planning

Capacity Planning and Management May Not Be Adequate For The Upgrade Project

Capacity planning is a critical function at large data centers because it analyzes central processor usage, storage needs, and network performance. It then projects future needs based on the strategic plan.

Recommendation:

We believe the County must project its needs for CPU and DASD over the next 3-5 years in order to properly price the upgrade project and ensure that sufficient budget allocations are requested. These related costs needs to be included in the total project cost. Additionally, the new CAPS architecture will probably increase demands on network resources because it is a browser-based system.

We were informed about the possibility of AMS using the County of Orange to benchmark is new Advantage release. Should this occur, the County would obviously have the benefit of understanding first-hand the capacity implications of the new architecture.

Response:

Concur - Although there are certain procedures in place for capacity planning there is no formal process. The new CIO intends to implement a formal capacity planning process. Estimated completion is 4th Quarter, 2003.

9. Documentation Standards

Any Gap Between AMS And County Documentation Requirements Must Be Addressed

Recommendation:

We suggest that documentation available for the existing CAPS release be reviewed and mapped into the CMM/SEE methodology. An issue could arise and require an Upgrade task to address gaps in AMS documentation and how the internal requirement will be satisfied.

Response:

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Management Response Continued

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